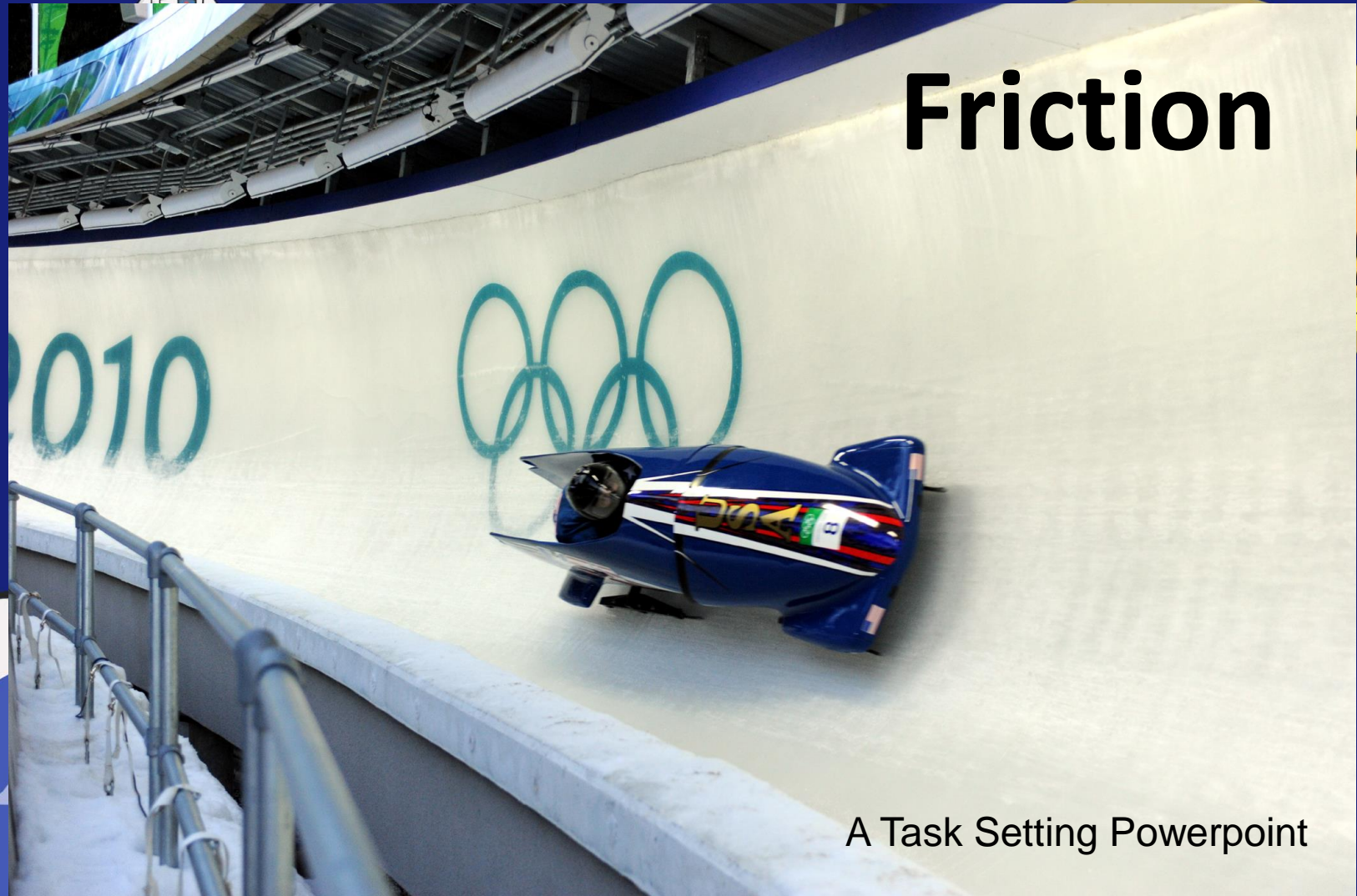




Friction



A Task Setting Powerpoint

Photo courtesy of FamilyMWR(@flickr.com) - granted under creative commons licence - attribution



LO: To understand that friction is a force that **slows down** moving objects and can stop objects from starting to move.

- To understand that when objects are pushed or pulled, an opposing push or pull can be felt.

Introduction

Friction causes moving objects to slow down. Without friction the world would be very different.

We would find it very difficult to stand up because we would have no grip on the floor.



Whoops!

You might be able to kick a football to the other side of the field with just a tap.



Air Resistance Recap

Every time something moves it experiences air resistance. This is a type of friction as it will always be pushing against whatever is moving.

It is most easily seen as work when you're running along or riding your bike. You will see your clothes rippling and your hair being pushed back as you move forward.



Air Resistance Recap

Parachutes

Parachutes rely on friction in order to work. This friction comes in the form of air resistance, as a pushing force. A parachute's job is to cause as much friction with the air (air resistance) as possible, so it needs to be as big as possible.

More friction means it will fall at a slower speed.



Air Resistance Recap

Imagine somewhere with no air (this is called a **vacuum**, which is where we get 'vacuum cleaner' from).

There would be no friction (air resistance).

What do you think would happen if you tried to open a parachute?



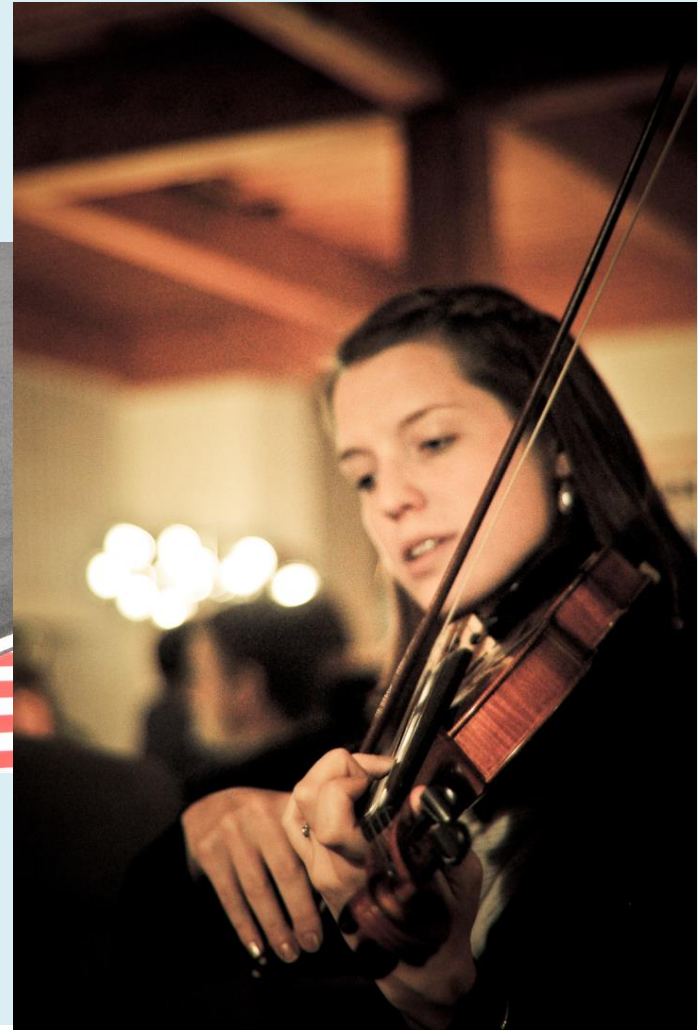
If you tried to open a parachute somewhere where there is no air then there would be no **air resistance** (friction), so there would be nothing **pushing** against the inside of the parachute to make it open up. In fact, it would most probably just stay inside its bag when the release chord has been pulled.



No air, no friction!!
Argh!!



Why wouldn't these activities work in a world **without** friction?



Photos courtesy of Michael Elleray and F. Montino(@flickr.com) - granted under creative commons licence - attribution

Gravity is a **non-contact force**, because it pulls objects towards the centre of the Earth without touching them. You can't see non-contact forces.



Magnetism is another example of a non-contact force.

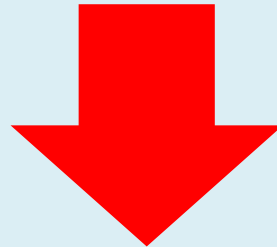


Photo courtesy of Expert Infantry and Judith jowers(@flickr.com) - granted under creative commons licence - attribution

Question

Is **air resistance** a type of **friction**?

Why/why not?



Air Resistance

Every time something moves it experiences air resistance. This is a type of friction as it will always be pushing against whatever is moving. It is most easily seen at work when you're running along or riding your bike. You will see your clothes rippling and your hair being pushed back as you move forward.

Parachutes

Parachutes rely on friction in order to work. This friction comes in the form of air resistance as a pushing force. A parachute's job is to cause as much friction as possible, so needs to be as big as possible. More friction means it will fall at a slower speed.

Gravity causes the planets in our Solar System to **orbit** the Sun. It also causes the moon to orbit the Earth.

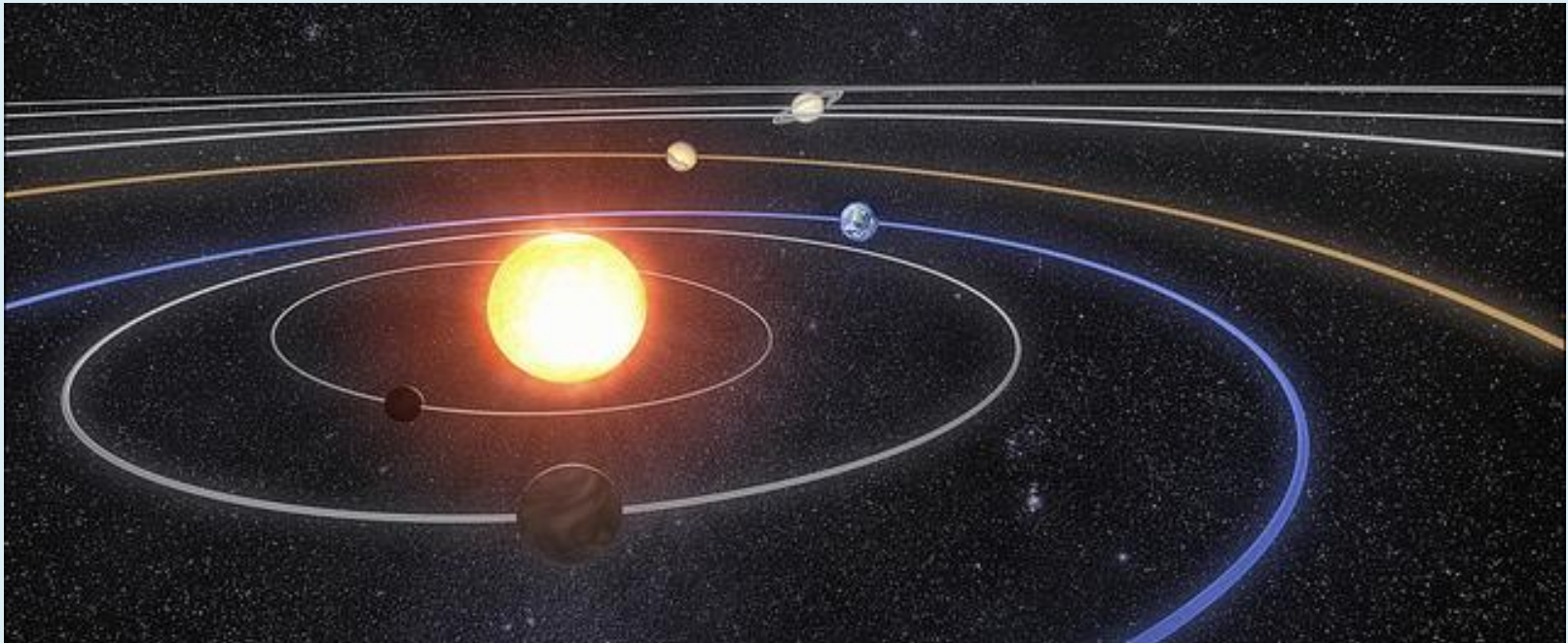


Photo courtesy of Expert Infantry and Judith jowers(@flickr.com) - granted under creative commons licence - attribution

Question

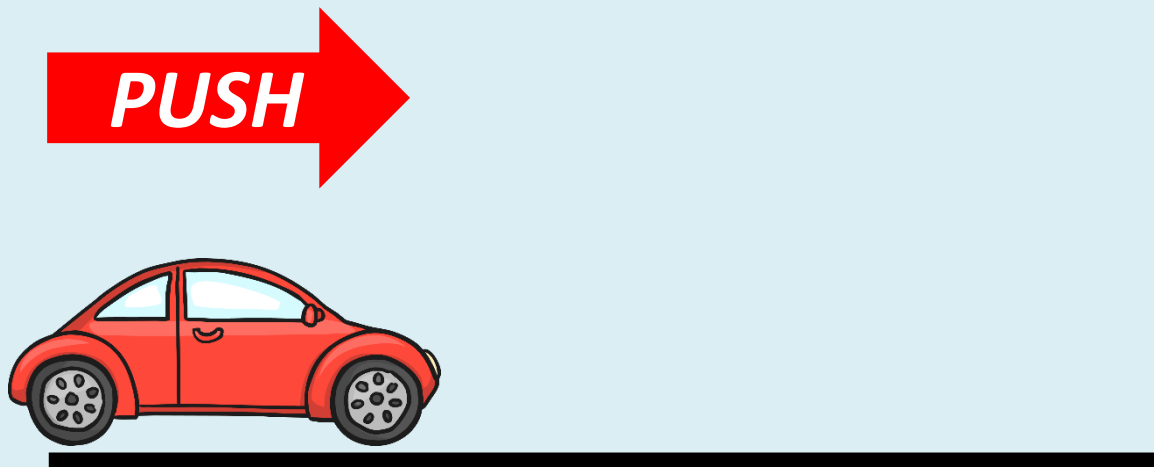


Rollercoasters use gravity to make them travel down scary drops!

Can you think of any other activities or objects that need gravity to make them work?

Question

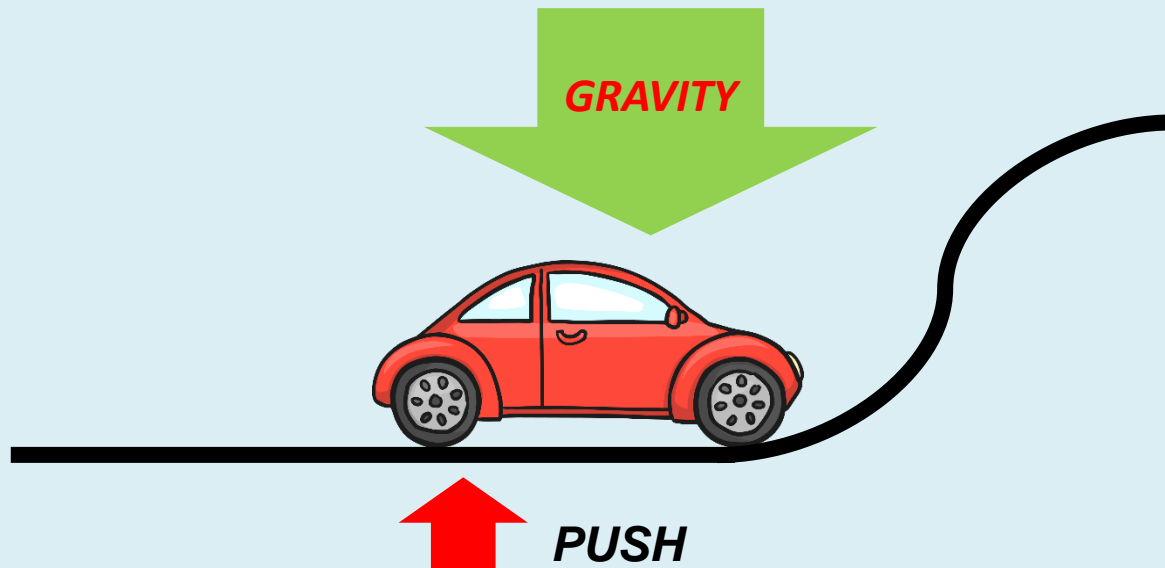
If there was no friction, how far do you think the car would get and why?



Answer

As long as the surface was flat, the car would keep rolling for ever.

However, the force of gravity would still act on the car and this could stop it from travelling up any hills.



Opposing Forces

When an object is pushed or pulled an **opposing force** can be felt.

Can you name the opposing forces for these pushes and pulls?



Pull: **Gravity**
Push: _____

Opposing Forces



Push: **Jump**

Pull: _____

Opposing Forces



Push: **The engine, driving the wheels of the train.**

Pull: _____ and _____

Photos courtesy of Alain Gavillet(@flickr.com) - granted under creative commons licence - attribution

Activity

The Super-Grip Shoe Challenge

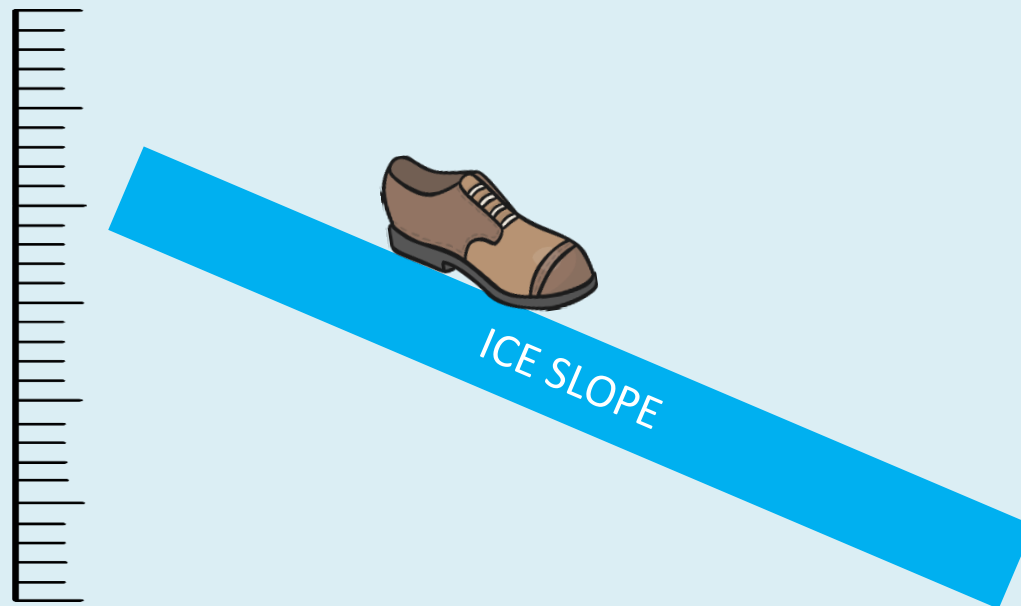
An expedition team have asked our class to design footwear to help them walk across miles of Arctic ice on their next expedition.

What will you need to think about when you are designing your shoe?



The Super-Grip Shoe Challenge

You will now be given one shoe (block). Every shoe has a different material on the sole.



You need to predict which of the sole surface will be the best one when walking on the steep ice slopes.

The winning shoe will be the shoe that sticks to the steepest slope of ice.

Plenary

Which of these statements do you think is correct?

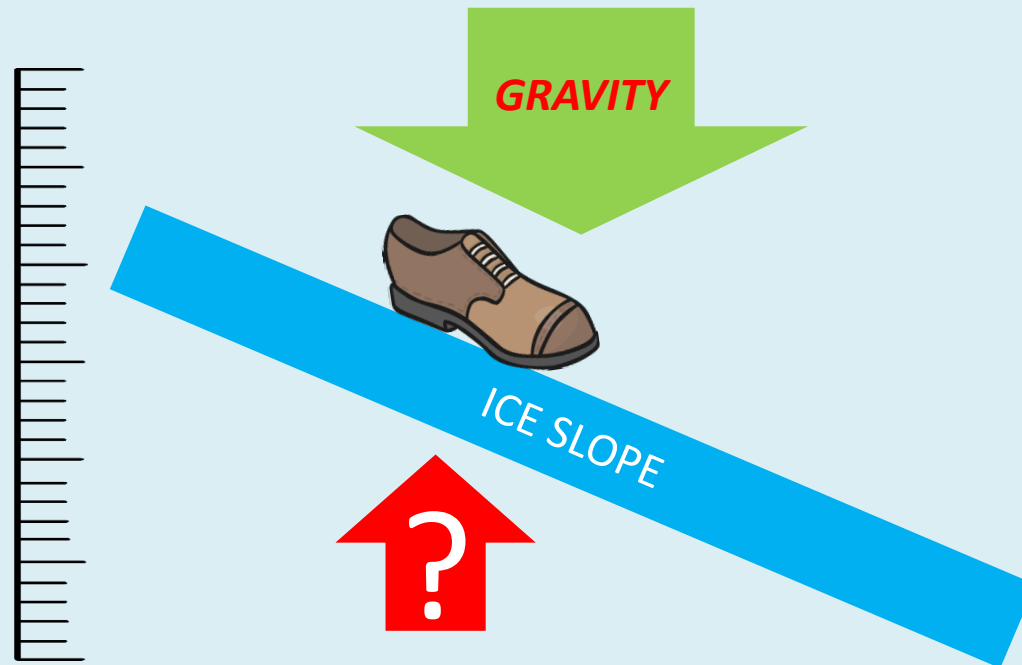
The friction of the shoe stopped it from moving on the ice.

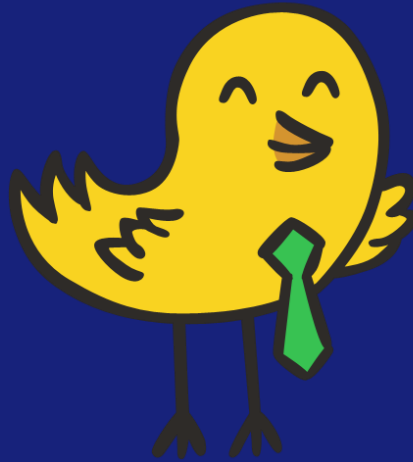
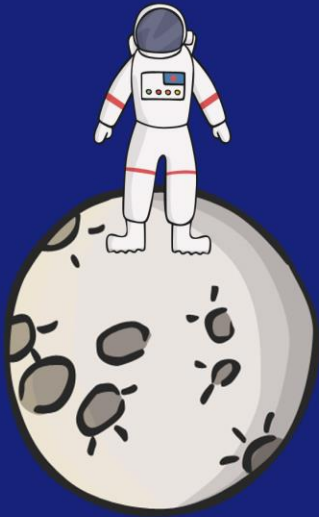
The friction of the ice slowed the shoe down.

The friction of the shoe made it slide down the ice faster.

Plenary

If the force of gravity was trying to pull the shoe down to Earth, what was the opposing force?





THE END

